

NICARAGUAN ORCHID STUDIES — 1

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The present series of articles will deal with new or otherwise noteworthy orchids of Nicaragua. This is the largest of the Central American countries, and it has until very recent times been essentially unknown botanically. Even today the casual collector comes up with important additions to the indigenous flora with truly remarkable frequency, in virtually all groups of plants.

The senior author has resided in Nicaragua for some ten years. During this period, on several occasions with the junior author, he has visited many parts of the republic, paying especial attention to the Orchidaceae. The plants have been transported to the Jardin Heller, at Quinta Monte Fresco, near Managua, where they are cultivated under glass, in lath-houses, or on trees or special tables outdoors. Studies of specimens blooming, season after season, under these admirable conditions offer materials infinitely superior to those to be encountered in the desiccated or pickled contents of the herbarium. Detailed drawings, color photographs, and critical descriptions are made of each plant which flowers.

When this study of the Nicaraguan Orchidaceae was commenced about 1956, a total of 139 species and varieties were recorded from the country. Now, in September 1966, the total of authenticated indigenous representatives of the family stands at 543, and it is increasingly added to as our work progresses.

The reader is referred to the series of articles by Hawkes, "An Orchid Collecting Trip to Nicaragua," published in The Orchid Weekly, Volumes 1 and 2, 1959, and reprinted in a revised form in The Orchid Review, Volumes 72 and 73, 1964 - 1965, for pertinent locality data and general information on the floristics of the land.

In this series, the genera and infra-generic taxa are considered in alphabetical sequence.

EPIDENDRUM L.

The total number of representatives of the huge aggregation generally considered to comprise the genus Epidendrum L. which occur in Nicaragua is still uncertain. This since many of the collections

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by the writers have obviously been sadly mis-identified by the orchidological "experts" to whom they have been submitted are undergoing further critical study. The precise confines of Epidendrum L., sensu lato, are also being taken up by us, and by several of our colleagues, at this time.

Until we have our decisions fully formulated, the following singularly spectacular "true" Epidendrum has been found and requires establishment as a new species.

EPIDENDRUM HAWKESII A.H.Heller, sp.nov.

Planta ordine epiphytica, erecta, basin radicante (non supra). Foliis magnis, rigidis. Racemis erectis, longe-pedunculatis, usque ad 60-floris. Floris in sectione speciosis. Labellum valde 3-lobis, margine dentatis serratisque, lobum medium cuneato-flabellato, fortiter retuso; callis 2, alatis, ad apicem convergentes, medio lamellum erectum sigmoideum ornatum.

Plant normally epiphytic, but taking root on sharp overcut grassy slopes as a stilt-rooted plant with other customary epiphytes. Stems crowded or borne from the rhizome at some slight distance from one another, simple, rigidly erect, with profuse basal (no lateral) white, rarely branching roots; stems to 1 m tall, up to 6 mm in diam., below concealed by sheaths which are usually densely mottled or flushed with dark dull purple, slightly fractiflex in leaf-bearing upper portion. Leaves 3.75 - 11 cm long, 4 - 4.5 cm broad, obovate to oblong-elliptic, rather concave, with rounded slightly retuse apex, heavily fleshy-coriaceous and rigid, more or less mottled and spotted with dull purple on both surfaces, especially the underside. Inflorescence a very compact, densely-flowered raceme 2 - 3 cm long, on a peduncle up to 50 cm long, 20 - 60-flowered, the peduncle dull vinous-purple, mostly covered by scarious sheaths; rachis 4 - 6 cm long; a secondary branch customarily appears on each inflorescence the second season, this with an enlarged base, branching off from base of the original rachis. Floral bracts triangular-ovate, 4 mm long. Pedicellate ovary erect, lightly arcuate, dull vermilion, 4 - 5 cm long. Flowers very showy, 3 cm long, 2.5 cm broad, spreading, long-lived, vivid carmine lake with dark yellow calli on lip, the column-apex also yellow, the anther-cap apple-green. Sepals and petals rather rigidly heavy-textured, acute, nervose with raised nerves; those of the sepals 5; dorsal oblanceolate, 1.5 cm long, 4.5 mm broad, reflexed above middle; laterals oblique, narrowed basally, unevenly spatulate, being expanded or lobulate on inside margin, 1.6 cm long X 4 mm broad. Petals 7-nerved, obovate, acute, the margins above middle lightly toothed, 1.5 cm long X 5.5 mm broad above middle, ascending. Lip adnate to apex of column, deeply 3-lobed, basally truncate, 8 mm long X 1.2 cm broad, the margins irregularly but shortly toothed or serrated; midlobe separated from lateral lobes by a short 3 mm broad isthmus, cuneate-flabellate, deeply re-

tuse to form a bilobed segment with an apicule in the sinus, 4 mm long X 6 mm broad. Disc with 2 prominent flap-like calli at base whose apices converge; a prominent erect sigmoid keel extends from base to apex of lip. Column almost straight, with conspicuous flaring angles especially towards apex, clavate, 1 cm long. Capsule long-stalked, to 4 cm long and 1.5 cm thick, with 3 prominent blunt keels, when mature heavily flushed with dark dull vinous-purple.

NICARAGUA: Dept. Zelaya: Rama (Roosevelt) Highway, beyond Río Mico bridge, frequent stilt-rooted orchid on moist grassy roadside bank, alt. about 400 - 600 feet, 30 March 1966, A. H. Heller & A. D. Hawkes 8344 (Type in Field Museum of Natural History).

Epidendrum Hawkesii is an ally of the widespread E. ibaguense HBK, but differs from that species, which habitually occurs at far higher elevations, in a number of vital respects. Erect-growing, rigidly so, it bears roots only basally, not scattered up the viney stems of the ally, which are in our area sprawling or even clambering into adjacent umbrage. The leaves of the novelty are of divergent shape, heavier texture, and larger dimensions. And floral dimensions, color, and shape are conspicuously different. Details of all parts of the flowers—which are extremely numerous per inflorescence (up to 60), and particularly the lip with its complex callosities, and the column, are important.

In the wild, this splendid orchid was first found as a solitary specimen some years ago by the senior author; this occurred as a true epiphyte, but regrettably no materials were preserved, except for a sketch. The habitat from which the present type materials were gathered is an exceptionally interesting one, in that the highway cuts through hillsides at a somewhat higher elevation than the epiphytic specimens have as yet been located. Yet these type plants, which within certain restricted regions are very abundant and spectacular when in flower (they would otherwise pass unnoticed), can be considered as almost epiphytic, since they are found perched loosely on intricate stilt-root systems on leafy humus on sheer hillsides along with such other normal epiphytes as a handsome form of Gongora maculata Ldl., Ionopsis utricularioides (Sw.) Ldl., and Polystachya cerea Ldl. Additional orchidaceous neighbors are large clumps of Sobralia fragrans Ldl. and an as yet unidentified member of that genus. In this region the original forests in which these Epidendrums doubtless occurred as epiphytes were cut over about the year 1960. It would appear that the new species has admirably made a necessary adaptation to a radical change of environment.

One additional specimen of the novelty, growing epiphytically on a bare twisted Bauhinia liana in a hot, humid, palm-aroid jungle near La Esperanza (Río Siquía) was collected in March, 1966, but

did not survive. And several plants from the Río San Juan, near San Carlos, were found by H. F. Cross, of Managua, who presently has them in his extensive greenhouses there.

Epidendrum Hawkesii has been introduced into cultivation into the United States, through seed. The new species is named to honor the junior author of these studies, and of the recent Encyclopaedia of Cultivated Orchids (Faber, London, December 1965).

HELLERIELLA A.D.Hawkes, gen. nov.

Among the most exciting of our discoveries in the Nicaraguan orchid flora to date has been a large epiphytic plant which obviously represents a genus new to science.

HELLERIELLA A.D.Hawkes, gen. nov.

Planta epiphytica magna conspicue ramosa. Inflorescentiis racemosis lateralibus terminalibusque. Floris in subtribo majusculis, patentibus. Sepalis petalisquam valde amplioris. Pes columnae valde prominens. Pollinia 4.

This new genus is a member of the subtribe Ponerinae. It is closest in its affinity to Platyglottis L.O. Wms., apparently endemic to Panama. Helleriella, however, differs in its conspicuous branching habit, lateral as well as terminal inflorescences, larger spreading flowers of different shape with sepals much broader than the petals, a prominent column-foot, and four pollinia instead of six. The species described below is the sole member of the genus known to date.

HELLERIELLA NICARAGUENSIS A.D.Hawkes, sp. nov.

Large epiphytic plant, to 3 m long (averaging about 1 m long), the new growth leafy and erect, the old growths branched and pendent, leafy only on upper parts of main stem and branches. Roots flexuose, fleshy, to 15 cm long and 5 mm in diam. Rhizome woody, stout, black, up to 8 mm in diam., with stems arising at intervals of 1 - 2 cm. Stems to 3 m long, terete below, compressed above, to 1 cm in diam., woody and bamboo-like, with pithy center, gradually deciduous from the base after the first year's growth, when branches up to 30 cm long appear, with adventitious roots at the nodes; base of branches often very slender (1 - 2 mm diam.), increasing in diam. upwards. Stems and branches concealed by stiff, striated leaf-sheaths averaging 2 cm long; lower parts of stems when exposed often turning black or red-brown. Leaves ligulate, chartaceous, articulated with leaf-sheaths, the margins recurved, the basal margins somewhat crenulate, sharply carinate, the apex obliquely retuse, those of the new growth up to 13 cm long and 4 cm

broad, those of the branches up to 8 cm long and 1.6 cm broad. Inflorescences terminal on new growth and secondary branches, and lateral on old leafless stems and branches; peduncle stout, very abbreviated, occasionally up to 5 mm long, with a number of dry scarious bracts at base; rachis flexuose, up to 1.5 cm in length, with up to 6 successive flowers borne about 2.5 mm apart. Flowers rather large for the subtribe, up to 3.5 cm in diam., spreading, lasting about one week, the sepals and petals greenish to yellowish-white, often with either red or green nervation, the lip with 5 red median nerves. Floral bracts ovate, closely appressed, purplish, up to 3 mm long. Pedicellate ovary up to 1.3 cm long, arcuate, usually purple-striate. Sepals stiff, 5-nerved, with an acute fleshy apex, the basal part a bit fleshy, verruculose outside, the dorsal one 2.1 cm long and 6 mm broad near base, the apex slightly reflexed, the upper half shallowly concave, the lower portion convex; lateral sepals oblique, 2.2 cm long and 7 mm broad at base, slightly concave, dorsally carinate, subacuminate, forming a prominent mentum with the column-foot. Petals concave, 5-nerved, the median nerve sulcate on rear, ovate-lanceolate, acuminate, 1.8 cm long and 4 mm broad below middle, narrowed to an abbreviated 2 mm broad basal claw. Lip freely mobile, subpandurate, the basal 1/3 fleshy and at right angles to rest of segments in natural position, very shortly clawed, 1.8 cm long and 9 mm broad above middle, 5 mm broad at constriction, and 6 mm broad below that, the margins of upper half finely serrate or vaguely erose, the apex sharply apiculate; disc with a prominent rib extending from base to apex, where it terminates in an apicule, with 3 shorter elevated costae arising on each side of median rib. Column slender, arcuate, 9 mm long, with a prominent foot 4 mm long, apically with short lateral teeth and a tridentate tooth at the rear; anther quadrilocular, with 2 pairs of equal, compressed, triangular, waxy pollinia, each pair with reflexed farinaceous broad stipe as long as pollinia.

NICARAGUA: Dept. Jinotega: Near Jinotega Rock Quarry, epiphytic on scattered trees in and around pasture, alt. about 4700 feet, December 1959, A. H. Heller & A. D. Hawkes 1270 (Type in Field Museum of Natural History). Same locality, June 1960, A. H. Heller 2684.

Helleriella nicaraguensis has been found to date in only one locality in Nicaragua, in the vicinity of the Jinotega Rock Quarry, between Matagalpa and Jinotega. Here it is reasonably frequent, and occurs with an extraordinary wealth of other orchidaceous plants, many of them notable rarities. Its seemingly restricted dissemination is perhaps explained by the remarkable scarcity of production of seed-capsules. Careful self-pollination of living specimens at Monte Fresco has thus far failed to set these fruits.

The junior author accompanied Heller when this unusual and attractive orchid was first discovered, and it is a distinct personal pleasure to commemorate this active orchidologist's labors, once again, this time in his glorious adopted land.

LEPANTHES Sw.

Of 66 species of this highly technical genus recorded from Mexico and Central America, only one had been authenticated from Nicaragua prior to the commencement of this study of the indigenous orchid flora. To date, we have found twelve species of Lepanthes in our area, including the following charming epiphyte here established as new to science.

Additional botanical exploration of Nicaragua will doubtless increase the number of these pleurothallids here, since there are 35 species in Costa Rica and 4 in Honduras which have not as yet been detected within our territory of consideration.

LEPANTHES HELLERI A.D. Hawkes, sp. nov.

Planta epiphytica, parva, gracilis. Foliis orbicularis, fortiter concavis vel tubulari-cucullatis, margine saepe tangentibus. Floris usque ad 40 succedaneis, minutis. Petalis verrucosis, papillosis. Labellum forcipatum, lobo medio lineato, elongato, ad apicem tuberculatis ciliatis erectis ornato.

Plant erect, caespitose, 3 - 7 cm tall, the secondary stems very slender, concealed by 4 - 7 tubular, black, somewhat dilated, acuminate sheaths with reflexed margins and verrucose longitudinal costae. Leaves orbicular, sometimes broader than long, the largest about 2.1 cm long and 2.2 cm broad, always deeply concave and tubular-cucullate, with margins often touching, green to yellow-green in color, conspicuously marginate, abruptly contracted to a petiole 3 mm long, the apex rounded and minutely retuse, occasionally with an indistinct apicule in the sinus. Inflorescences 1 - 3 per growth, usually shorter than the leaves, about 2 cm long, bearing up to 40 successive flowers on each distichous raceme. Floral bracts 1 mm long, ovate, acuminate, verrucose. Flowers spreading, about 5 mm long, the sepals light greenish-yellow, the lateral lobes of the lip and posterior lobes of the petals ochraceous bordered with magenta, the anterior lobes of the petals ochraceous, remainder of lip and column magenta. Pedicellate ovary filiform, 1.5 mm long, the pedicel persistent. Sepals elliptic-lanceolate, acute, 1-nerved, the dorsal 2 mm broad at middle, the laterals united to about the middle, 1.5 mm broad. Petals transversely bilobed, with a minute apicule in the sinus, the surface and margins minutely but densely papillose, the anterior lobe triangular, subacute, small, 1.1 mm long and 0.5 - 0.6 mm broad, the posterior lobe broadly

oblong with obliquely obtuse apex, 1.5 - 1.8 mm long and 0.7 - 0.9 mm broad. Lip forcipate, bilobed, about 1 mm long, with fleshy verrucose falcate-lanceolate lateral lobes, the apices of which converge around the column-apex, the midlobe a linear elongated projection with erect tubercular ciliations near tip. Column slender, clavate, arcuate, verruculose especially towards base, 1.5 - 2 mm long; anther large, ovoid, with 2 linear pollinia.

NICARAGUA: Dept. Jinotega: Jinotega Rock Quarry, epiphyte on dry branchlets of small trees, common where found, alt. 4700 feet, August 1964, A. H. Heller 5163 (Type in Field Museum of Natural History). Cerro Volcán Grande, alt. 4000 feet, A. H. Heller 1370. Finca Santa Fé, alt. 3200 feet, A. H. Heller 4529. Dept. Matagalpa: Finca El Roblar, alt. 2650 feet, A. H. Heller 4023. Depts. Matagalpa & Jinotega: Between Cerro Matapalo (Tuma Grade) and Jinotega Rock Quarry, alt. 3200 - 4700 feet, A. H. Heller (& A. D. Hawkes, in part) 1080, 1088, 2539, 2893, 3023, 3078, 3166, 3241, 3695.

This fascinating Lepanthes, with its jewel-like flowers borne inside the cup-like leaves, is somewhat allied to L. rotundifolia L. O. Wms. of Panama, differing in the foliage, the not malleoliform lip which has a linear midlobe, and in the verrucose and papillose petals, lip, and column. Lepanthes turialvae Rchb.f., from Guatemala, Honduras, Nicaragua (new record!), and Costa Rica, differs from L. Helleri in elliptic, flattened leaves, an almost obsolete midlobe of the lip, ciliate margins of the lip's lateral lobes, and the apex of the anterior lobes of the petals, which is abruptly contracted to a falcate, subacute tip.

In the wild, Lepanthes Helleri, which though apparently rather restricted in its dissemination, is on occasion locally common, grows variously on low scrubby primarily leguminous trees (especially Acacia spp.) with Masdevallia chontalensis Rchb.f. or on guavas (Psidium Guajava L.) with Oncidium crista-galli Rchb.f. Both in the wild and in cultivation, this elfin new Lepanthes is essentially ever-blooming.

PLEUROTHALLIS R. Br.

As of this writing, fifty-three species of Pleurothallis R. Br. have been found in Nicaragua. Until Heller commenced his activities in the republic, the total of recorded representatives of this fascinating and complex genus stood at seven.

Five very interesting Pleurothallis from the Nicaraguan collections are here described as new to science. A forthcoming paper in this series will discuss the records new to the regional flora.

PLEUROTHALLIS ALEXII A.H. Heller, sp. nov.

Planta epiphytica, erecta. Foliis linearo-ligulatis, coriaceis, ad apicem tridentatis. Inflorescentiis filiformibus, paulo elongatis, 2-floribus. Floris nutantibus, campanulatis. Petalis carnosissimis, concavis. Labellum ligulatum, sulcatum, ad apicem convexum, verruculosum, ad margine parce glanduloso-pilosum, supra basin auriculae parvae rotundatae ornatae.

Plant caespitose, about 5 cm tall, the rhizome creeping, bearing secondary stems at intervals of 1 - 2 mm. Secondary stems 1 - 1.5 mm long, concealed by scarious sheaths up to 1 mm long which also enclose the petiole. Leaves linear-ligulate, tridentate at apex, coriaceous, including the 1 cm long petiole to about 5 cm long, to 7 mm broad at middle. Inflorescence horizontal for half its length, then obliquely erect, the peduncle reddish-green, filiform, 6 - 8 cm long, with three nodes on basal third each with a 4 mm appressed sheath, with a fourth somewhat inflated sheath 5 mm long at middle. Flowers two, borne successively, large for the plant, about 1.5 cm long, nodding, the apical half of sepals dark wine-purple, the lower half striped with white; petals dark wine-purple; lip yellowish with red calli and an ochre apex; column ochraceous, with the anterior margin and foot reddish, the anther-cap white. Pedicellate ovary filiform, arcuate, verruculose above, maroon in color, 8 mm long. Sepals connate at base, 3-nerved, the exterior sparsely verrucose, the dorsal one ovate-lanceolate, shortly acuminate, 1.3 cm long and 3.8 mm broad near base, concave there, otherwise convex, the midnerve strongly carinate, the lateral nerves slightly carinate; lateral sepals connate to 3 mm from apex, 1.5 cm long and 7 mm broad when expanded, the midnerve ancipitously carinate. Petals very fleshy, concave, the surface sparsely glandular, 3.5 mm long and 2 mm broad above the middle, obliquely expanded upwards on anterior margin, the apex subacute. Lip ligulate, sulcate, 4 mm long and 1.8 mm broad above middle, the apical part convex, the apex broadly rounded and broadly retuse, with an erose apicule on the underside; a rounded auricle is set on each side of the narrowed portion about one-third from base; entire surface finely verruculose, the margins sparsely glandular-pilose; calli paired, small, basal, pilose. Column conspicuously clavate, broadly winged, 3 mm long, with a 2 mm long foot, elevated at base of foot and glandular on sides, the apex with three teeth, the posterior one broad and denticulate, the lateral ones acuminate.

NICARAGUA: Dept. Matagalpa: Cerro Matapalo (Tuma Grade), epiphytic, alt. about 3200 feet, July 1965, A. H. Heller 8631 (Type in Field Museum of Natural History).

A pickled specimen is on deposit at the Oakes Ames Orchid Herbarium of Harvard University.

Pleurothallis Alexii appears to have no particularly close allies in the Central American flora. It can be compared with the widespread P. Brighamii S. Wats., but differs in its drooping campanulate flowers, the very fleshy concave petals, and the structure of the lip. It is named to honor the junior author of this series of studies.

PLEUROTHALLIS CARNOSILABIA Heller & Hawkes, sp. nov.

Planta caespitosa, variabilis, caulis secundariis gracilis, vaginae striatae, inflatae ornatis. Floribus fere duobus. Labellum late ligulatum, carnosum, longitudine cavae duae papillosae ornatae, ad basin lobis parvis tenuis porrectis dolabri-formis ornatis.

Plant caespitose, variable in size, in bloom from 2.5 to 12 cm tall, the secondary stems slender, 7 mm - 4 cm long, concealed by two scarious, striated, somewhat inflated sheaths. Leaves coriaceous, elliptic to oblong-elliptic, coriaceous, 2 - 7.5 cm long including the 5 mm long petiole, 1.2 cm broad at middle, the apex tridentate, with the middle tooth the longest. Inflorescence from base of petiole, arising from a sheath 2 - 3 mm long, lax, up to 2 cm long, spreading, usually 2-flowered, the peduncle flexuose, filiform; old peduncles frequently persist. Floral bracts 3 mm long, white, tubular, with an inflated apex, connate from above middle to base, with an apicule at the triangular apex. Pedicellate ovary arcuate, 5 - 6 mm long, reddish. Flowers about 1.5 cm long, the sepals magenta, white at base; petals green with vivid maroon nerves; lip white, with basal part of callus brownish-red, with three short red carinate nerves on underside; column maroon. Sepals 8 mm long, the dorsal joined to laterals above base, elliptic-lanceolate, subacute, concave, 4 mm broad at middle, with three carinate nerves on back, sparsely verrucose between these; laterals connate almost to the fleshy acute recurved apex, 6 mm broad when expanded, 4-nerved, the nerves carinate, broadly ovate-elliptic. Petals somewhat oblique and narrowed toward base, 4.5 mm long and 2.1 mm broad, spreading, sub-spatulate to obelliptic, with three prominent raised papillose veins on inner surface, the one on anterior margin raised as an erect lobule above the middle, the surface verrucose between the nerves, the apex rounded, cucullate and muricate. Lip 6.5 mm long and 3.5 mm broad above the middle, the lamina broadly ligulate, entire surface except apex scurfy, the apex smooth, rounded, sub-bulbose; unusual longitudinal papillose excavations occur on each side of median callus in upper half of lip; the base of the lip bears two thin porrect dolabriliform lobes 2 mm long; disc with a verruculose raised callus above base of claw, 1 mm broad near base and near

apex, extending down center of lip to within 1 mm of tip about, narrowed in middle where it is strongly pilose-verrucose; thick margins of the lip curve inwards to mask some of the excavations. Column 2.5 mm long, with a foot 1 mm long, narrowing upward to a triangular, acute, denticulate apex, the stigmatic cavity large, orbicular, medial; anther erect, vaguely sigmoid and narrow in lateral view, with denticulate apex; pollinia 2, linear, white, erect and parallel to column in natural position.

NICARAGUA: Dept. Chontales: Cerro Pistacho, Babilonia district, epiphytic on large mossy tree, alt. 2150 feet, May 1962 (flowering June and July), A. H. Heller 6537 (Type in Oakes Ames Orchid Herbarium of Harvard University).

There are apparently no Central American species of Pleurothallis even remotely related to P. carnosilabia. The closest ally would seem to be the Colombian P. triquetra Schltr., in that the lip has somewhat similar longitudinal excavations, but the present taxon differs widely in other respects. The basal part of the lip is much like that of P. pteroglossa Schltr., also from Colombia.

The specific epithet is given in allusion to the extremely fleshy labellum.

PLEUROTHALLIS CHONTALENSIS Heller & Hawkes, sp. nov.

Planta parva, caespitosa. Foliis erectis, obovatis, tridentatis. Pedicellis glandulo-pubescentibus, alae ancipitae prominentibus ornatae. Labellum oblongo-ligulatum, ad apicem rotundatum obtusumque, ad basin lobulis eerectis parvis denticulatis ornatis.

Plant caespitose, small, to 6 cm tall, the roots slender, flexuose, white, to 2 cm long, the secondary stems 5 - 7 mm long, concealed by white scarious sheaths. Leaves subcoriaceous, erect, obovate, tridentate but not oblique at apex, 3 - 4.5 cm long including the 5 - 10 mm long petiole, 0.8 - 1.3 cm broad above middle. Inflorescence solitary from base of petiole, erect, the peduncle filiform, to 4 cm long, glandular, with small basal sheath, usually bearing a single flower (this with lateral sepals uppermost in most instances) with an abortive attendant bud; on occasion old inflorescences indicate as many as five successive flowers. Floral bracts tubular, acute, glandular-pubescent, 2 mm long. Flowers not opening fully, about 1.5 cm long, ochraceous greenish-yellow, the petals and lip-callus orange. Pedicellate ovary glandular-pubescent, the ovary triangular with 3 high ancipitous wings and a lower one between each, the ovary 3 mm long, borne at right angles to persistent 1 cm long pedicel. Sepals ovate-lanceolate, acute, 1 cm long, 3-nerved, the surface somewhat glandular, the margins ciliate, the keeled nerves ciliate, the median one of the dorsal sepal ancipitous, prominent, this segment 3 mm broad below middle, its inner surface with

conspicuous bullate or ocellate spots; lateral sepals joined to within about 2 mm from apex, 4 mm broad above middle. Petals thin-textured, spatulate, with wide lobe on anterior margin, the apex falcately acute, narrowed basally, 2-nerved, 3 mm long and 1.1 mm broad above middle. Lip parallel to column, oblong-ligulate, with a rounded obtuse apex, broadest at base, 3.5 mm long and 1 mm broad near apex, fleshy, verruculose, sulcate, the apex more fleshy, margins ciliate, with an erect lobule on each side 1 mm from base; callus elevated, bifid, papillose, extending from lip-base to lateral lobules. Column slender, clavate, winged, 2.5 mm long, apically with 2 acuminate lateral teeth and a broad denticulate posterior one, the broadly elliptic, alate foot 1.2 mm long, at right angles to column; anther helmet-shaped, apiculate.

NICARAGUA: Dept. Chontales: Rio Mico, epiphytic, alt. 1500 feet, August 1960, A. H. Heller 3735 (Type in Oakes Ames Orchid Herbarium of Harvard University). Same locality, alt. 1400 feet, in bloom December, A. H. Heller 3575. Same locality, alt. 1400 feet, in bloom May and June, A. H. Heller 7827. Cerro El Chamarro, La Libertad district, epiphytic, alt. 2175 feet, June, A. H. Heller 1036.

Pleurothallis chontalensis belongs to the P. glandulosa Ames alliance, this including P. barbae Schltr., P. fulgens Rchb.f., P. glandulosa Ames, P. pertenuis C. Schweinf., and P. vitarii-folia Schltr. Its closest ally appears to be the Costa Rican P. barbae Schltr., from which it differs in the following respects: broad, not linear leaves; although the pedicel is glandular-pubescent, the ovary is only sparsely so, and has very prominent ancipitous wings; the floral bracts are densely glandular and acute, not apiculate; the inner surface of the dorsal sepal has bullate or ocellate spots of some prominence, these not noted in P. barbae; the lip is of divergent shape, and the two lateral lobules are very small and denticulate; the column-foot lies at right angles to the column, is broadly suborbicular, separated from the column by a constriction or isthmus, and is deeply excavated with wing-like margins; and the lateral teeth at the apex of the column are acuminate, while the broad triangular posterior one is lacerate.

This pretty novelty is named for the spectacular Nicaraguan department in which it occurs with some frequency.

PLEUROTHALLIS EXESILABIA Heller & Hawkes, sp. nov.

Planta caespitosa, parva. Foliis crassis, oblanceolatis, tridentatis. Inflorescentia singula, filiformis, 3-4-floribus succedaneis producens. Labellum panduratum, exesum, inflatum, foramen in medio discum occuparum.

Plant caespitose, small, in bloom to 4 cm tall, the secondary stems almost obsolete, 3 mm long, concealed by scarious white sheaths. Leaves thickly coriaceous, 1.2 cm long, including a petiole of about 2 mm, 3.5 mm broad above the middle, oblanceolate, tridentate at the apex. Inflorescence solitary, to 4 cm in length, the peduncle filiform, reddish, bearing a solitary infundibuliform bract near middle and 3 or 4 flowers, these opening successively. Floral bracts tubular, 1 mm long. Flowers opening well, about 1 cm long, the sepals and petals pale greenish-yellow with reddish longitudinal veins, the lip reddish-brown with pale greenish-yellow basal portion, the column greenish-yellow, reddish between wings on anterior surface. Pedicels persistent, the pedicellate ovary reddish, 4 mm long. Sepals lanceolate, acute to subacuminate, with strongly serrated margins, 6 mm long, the dorsal 1.5 mm broad, with 3 carinate nerves, the laterals free almost to base, lanceolate, vaguely falcate, with 2 carinate nerves, 1.8 mm broad below the middle. Petals ovate, long-acuminate, concave, sparsely toothed above middle, 1-nerved, 3 mm long and 1 mm broad. Lip pandurate, 2.5 mm long and 0.8 mm broad, hollow and inflated, the opening at center of disc, with 2 small teeth on claw and a large and broad falcate porrect lobule on each side at base of lamina, these lobules with incurved apices; callus raised, smooth, extending from claw to middle of lip, narrowly retuse at base; above the opening at the middle of the lip there is a slight swelling, but up from there to apex the lip is concave; apex of lip rounded, blunt, with long pilose hairs on margins and underside. Column 1.9 mm long, slender, somewhat arcuate, shallowly winged, with an entire apex; anther white, ovoid, contracted to a truncate apical neck, the 2 pollinia white.

NICARAGUA: Dept. Jinotega: near Finca Santa Elena, Matagalpa - Jinotega Highway, on fallen branch with Pleurothallis fuegii Rchb.f., alt. 4510 feet, in bloom July 1962, A. H. Heller 6497 (Type in Oakes Ames Orchid Herbarium of Harvard University).

In habit, structure of the sepals and petals, as well as general shape of the lip, this remarkable novelty is reminiscent of Pleurothallis samacensis Ames, of Guatemala and Costa Rica. It differs, however, in the hollow lip, this with a small orbicular opening at the center of the disc. The apical portion of the labellum, further, bears long hairs which are lacking in P. samacensis.

The specific name is derived from the Latin, exesus, hollowed out, and labium, lip or laebellum.

✓ PLEUROTHALLIS HELLERI A.D.Hawkes, sp.nov.

Planta pro genere multo procera, erecta. Foliis subcoriaceis, nervosis, ellipticis, ad basin apicemque contractis, mag-

nis. Inflorescentiis pluribus, flexuosis, gracilis, multifloris. Floris patentibus. Labellum carnosum, verrucosum, infra medio 3-lobatum, lobum medium oblongo-ovatum, obtusum, ad basin callis duobus elevatis mammillatis ornatum.

Plant large for the genus, to 50 cm tall, the rhizome abbreviated, stout, woody, set with scarious fibers and flexuose white roots 1 mm in diameter. Secondary stems erect, borne at intervals about 1 cm apart, terete, glabrous, to 35 cm long, 2 - 3 mm in diameter, with a striated sheath 1.5 cm long at base and another one 4 cm long near middle. Leaves obliquely spreading, subcoriaceous, nervose, elliptic, abruptly contracted to a subacuminate tridentate apex, contracted at base to a conduplicate petiole 1.5 cm long, up to 20 cm long and to 6 cm broad at middle. Inflorescences 2 to 6 straggly, flexuose racemes to 10 cm long, arising from a 4 mm keeled spathe, arching to sub-pendent, the peduncle slender, 1 - 2 cm long, the rachis bearing 10 to 20 flowers about 1 cm apart. Floral bracts triangular-ovate, inflated, 1.5 mm long. Flowers spreading, about 2 cm long when expanded, greenish-yellow with red dots on the lateral lobes of the lip and its callus. Pedicel persistent, filiform, 3.5 mm long, the ovary 2.5 mm long. Sepals lanceolate, long-acuminate, setaceous, dorsally carinate, 1 cm long, the dorsal 2.6 mm broad near ovate base, 3-nerved, the laterals connate to the narrowly truncate apex, 4-nerved. Petals narrowly linear, attenuate, setaceous, 1-nerved, 9 mm long and 0.6 mm broad at base, spreading. Lip fleshy, 2 mm long and 0.7 mm broad, slightly arcuate in natural position, verrucose, with a short membranaceous cucullate claw, 3-lobed below middle with thin, erect, rounded lateral lobes which are difficult to spread out, the midlobe oblong-ovate, obtuse; disc with an elevated mammillate callus along the base of each lateral lobe. Column short, 1.5 mm long, stout, clavate, finely papillose especially on the prominent rounded column-foot; anther subquadrate, with 2 verruculose pollinia.

NICARAGUA: Dept. Chontales: Cordillera Amerrisque, epiphyte, alt. 2700 feet, December 1962, A. H. Heller 3784 (Type in Field Museum of Natural History; isotype in Oakes Ames Orchid Herbarium of Harvard University). Río Mico, alt. 1150 feet, January 1963, A. H. Heller 7870.

As yet, this singularly attractive *Pleurothallis* is known only from two localities in Nicaragua's Departamento de Chontales. It may, however, be more widespread here, since its habit is superficially much like that of the common and widespread *P. gelida* Ldl., and its distinctiveness would not have been noticed unless specimens were encountered in bloom. *Pleurothallis Helleri* is distantly allied to *P. ruscifolia* R. Br., distributed from Cuba and Guatemala to northern South America. The inflorescences of the latter, however, are glomerate or fasciculate, with

obsolete peduncles, while in the present novelty up to twenty flowers appear on each of the multiple rather elongate racemes. Floral structure, too, of P. Helleri, particularly details of the lip, differs from all other members of the genus with which we are familiar.

The new species is named to honor the senior author of this serial, A. H. Heller, who has immeasurably increased our knowledge of the orchids of his adopted land, Nicaragua.

SOBRALIA R. & P.

Of the 35 Sobralias recorded from Mexico and Central America, only three had been authenticated from Nicaragua prior to the present study; eight species had been reported in the past, north of Costa Rica.

Thirteen representatives of Sobralia R. & P. are now known from Nicaragua, and the immense colonies of these spectacular orchids on Volcán Mombacho promise to add to this total as critical studies continue. Four new species are herewith described.

SOBRALIA CHATOENSIS Heller & Hawkes, sp. nov.

Planta epiphytica, brevis. Foliis rigidis, multi-nervosis. Floribus patentibus, speciosis. Labellum ellipticum, ad basin tubulosum, parve trilobatum, crenulatum, disco fossa depressa ornato.

Plant epiphytic, to 30 cm tall, profusely rooting. Stems leafy, with leaves spaced 3 - 4 cm apart, the leaf-sheaths spotted with red. Leaves rather stiff and rigid, to 16 cm long and 5 cm broad, with 9 major nerves, the median one of which has a dorsal keel, on each side of which are 2 minor accessory nerves. Flowers showy, short-lived, spreading, about 10 cm across in natural expansion, the sepals and petals magenta, lighter towards base; apical margins of lip rich magenta, the throat and disc ochreous-brown, the sulcate portion holding median nerves gold-ochre, the basal calli rich yellow; column yellow on anterior face, with purplish apical teeth. Sepals 7 cm long and 2.2 cm broad, oblanceolate, acute, shortly clawed. Petals 7 cm long and 2 cm broad above middle, oblanceolate, with slender claw, obscurely crenulate on apical margins. Lip elliptic, forming a firm tube clasping the column, 7 cm long and 5 cm broad when spread out, obscurely trilobate, the apical margins crenulate; disc with a flat depressed channel 5 mm broad down the middle which encompasses 5 raised median nerves which extend somewhat beyond middle of lip; there are no tubercles between the basal calli, which measure 1.5 cm in length. Column 4.5 cm long, clavate only near the apex.

NICARAGUA: Dept. Boaco: Cerro Chato, epiphytic, alt. 2500 feet, January 1964, A. H. Heller 9553 (Type in Field Museum of Natural History).

Sobralias on Cerro Chato are very rare, and this sole collection appears amply distinct from all others known to us from Central America. The median channel on the lip is especially unique.

SOBRALIA HAWKESII A.H. Heller, sp. nov.

Planta speciosa, caulis parce maculatis, gracilis. Foliis elliptico-lanceolatis, magnis. Floribus profusis, succedaneis, speciosis. Labellum ad basin tubulosum, ad sino apicem 5 nervis brevis elevatis pustulatis ornato.

Plant epiphytic, erect to spreading, up to 15 dm tall, profusely rooting, the roots forming sizeable mounds. Stems slender, 6 - 8 mm in diameter, slightly maculate, the leaf-sheaths maculate and verrucose. Leaves elliptic-lanceolate, acuminate, 11-nerved, up to 20 cm long and 7 cm broad, light green, with prominent ribs. Flowers produced successively almost throughout the year, lasting rather well for the genus, to 15 cm in diameter, the sepals, petals, and apical margins of the lip rich lustrous magenta-red, basal half of throat yellow, light lilac towards lateral margins, with a brown-ochre band between the yellow of throat and magenta-red lip-apex, the lateral teeth of the column purple. Sepals 7.5 cm long, apiculate, with 9 main nerves, the dorsal oblanceolate, 2.1 cm broad, the laterals elliptic-lanceolate, 2.5 cm broad. Petals elliptic-spatulate with a short narrow claw, 7.5 cm long and 6 cm broad above the middle, the diverging nerves with an intricate network of short obliquely transverse veins, margins crenulate in upper third, the apex subtruncate with a small triangular apicule. Lip tubular basally, 7.6 cm long and 6 cm broad when spread out, cuneate-obovate, somewhat constricted on crisped-undulate margins 1.5 cm from apex to form a subquadrate, deeply retuse apical lobule; disc with two yellow calli at base which are 1.5 cm long, and 3 median raised nerves which extend from base for three-quarters of entire length of the lip; a lateral nerve is present on each side, extending to the center of the lip, and a shorter nerve branches off from the base of each of these laterals; 5 mm from the apex of the three median nerves occur five somewhat blistered radiating nerves 5 mm in length. Column 3.5 cm long, triangular in cross-section, with a thin spreading wing on each side of the anterior face.

NICARAGUA: Dept. Granada: Volcán Mombacho, frequent epiphyte on thickly mossy trees in wet shaded forest, alt. 3950 feet, January 1960, A. H. Heller & A. D. Hawkes 3025 (Type in Field Museum of Natural History). Same locality, A. H. Heller 7728.

This strikingly beautiful orchid is a frequent inhabitant of the marvelous forests of Mombacho Volcano, haunt of an extraordinary array of different kinds of Sobralias. In addition to the present

S. Hawkesii, at least three others appear sufficiently distinct to warrant erection as new species; these will be discussed at a later date in this serial, upon flowering of additional living materials, and the complex forms which appear to be natural hybrids betwixt these populations will as well be considered.

Sobralia Hawkesii has no immediate allies with which we are familiar. It is related, obviously, to the as yet unnamed collection A. H. Heller 9132, also from Volcán Mombacho, but the light green (not dark blackish-green) leaves are more lanceolate and less stiff, the maculations on the leaf-sheaths are much less pronounced, floral form and dimensions are radically different, and the five short, raised, blistered nerves near the sinus of the lip are as well distinctive. It is a species of considerable horticultural potential, one which flowers profusely almost throughout the year at Jardín Heller, Quinta Monte Fresco, altitude about 1800 feet.

SOBRALIA HELLERI A. D. Hawkes, sp. nov.

Planta epiphytica, speciosa, erecta. Caulis robustis, flexuosis. Foliis plus minusve in plano singulo disponentibus, rigidis, fortiter plicatis, magnis. Floribus speciosis, non patentibus, singularis. Sepalis ad basin connatis. Labellum expansum ellipticum, prope saccatum, margine prope integrum.

Plant epiphytic, tall, to more than 1 m, erect-spreading. Stems stout and stiff, somewhat flexuose, up to 6 mm in diameter, smooth olive-green with distinct red-brown maculations on the leaf-sheaths. Leaves more or less in one plane, green, plicate, fairly stiff, borne 3 - 4 cm apart, the largest ones to 23 cm long and 8 cm broad, elliptic-lanceolate, acuminate, with 9 sharply carinate nerves, sulcate above; the laminae of the leaves overlap one another to a considerable extent. Flowers borne successively and frequently over a space of several months, lasting longer than usual for this genus, about 6.5 cm long, not widely expanding due to basally connate sepals, which are pure white; petals pure white; lip on inner surface rich blood-red, outer surface white except for red median nerve; column-face red. Floral bracts several, 3 - 4 cm long, forming an inflated, lanceolate, acuminate, rigidly erect sheath-like structure to 8 cm long. Pedicellate ovary slender, decurved, 3 cm long. Sepals soft-fleshy, 7-nerved, elliptic-lanceolate, apiculate, concave, 6.5 cm long, connate for 1 - 2 cm at base, the dorsal one 2 cm broad, the laterals oblique, 2.3 cm broad. Petals 7-nerved, the three median ones close together and raised, obliquely elliptic-lanceolate, apiculate, 5.5 cm long and 2 cm broad, the median nerve sulcate underneath, the posterior apical margin recurved, serrulate. Lip 7 cm long and 4.5 cm broad, cuneate in natural position, broadly elliptic when spread out, deeply conical to almost saccate, apical-

ly retuse with a convex bulge in the sinus, the margins entire except for indistinct serrations on extreme apical part, nerves numerous, indistinct, radiating, none of them elevated; disc with two linear erose papillose calli 2 cm long at base, these terminating in two to three very short ancipitous teeth. Column disproportionately elongate, 4 cm in length, slender, clavellate, 8 mm broad below apex, 2.5 mm broad at base.

NICARAGUA: Dept. Rivas: Volcán Maderas, Isla de Ometepe, Lago de Nicaragua, epiphyte in mossy rain forest, alt. 4000 feet, May 1963, A. H. Heller 8029 (Type in Field Museum of Natural History).

Sobralia Helleri appears totally distinct from all other described members of the genus. In the wild plants, at least, the leaves lie distichously in very much the same plane, with one conspicuously overlapping the other; in cultivation, this condition seems to vary to some degree. Though the flowers do not expand fully, because of the basal connation of the sepals, the pure white color of the outer segments beautifully sets off the incredible hue of the lip, a startling rich blood-red which is unknown elsewhere in the Orchidaceae, at least to this writer. The labellum, with its entire, unfrilled or non-crenulate margins, possesses a bulging, concave medial portion which is very fleshy and difficult to spread apart; some 5 mm inside the margins the lamina thins in texture and furls under towards the apex. There are no raised nerves nor lamellae, except the basal elevated calli. The white underside of the lip sports a striking red median nerve.

This is, in the opinion of the junior author, one of the most exciting of Heller's Nicaraguan discoveries to date. It is an uniquely beautiful Sobralia, one which immediately attracts the attention of the viewer, and its ease of culture (at considerably lower elevations than its cloud-wreathed native habitat) and profuseness of bloom at once recommend it to the connoisseur collector who values these remarkable orchids. It is indeed to be hoped that the fascinating Sobralia Helleri will ere long be made available, to selected orchidists, outside of its isolated, volcanic, insular home.

It appears that this new species is a narrow endemic to Volcán Maderas, on the island of Ometepe in Lake Nicaragua; its twin peak, Volcán Concepción, the taller of the pair, is persistently active. As of this writing, it is the sole species of its genus which has been discovered on the island, an area which has already produced some remarkable new genera and species for the Nicaraguan flora and for science (see Heller's article, "Notes from Nicaragua: Houlletia tigrina," in Amer. Orch. Soc. Bull. 35: 213 - 214. March 1966.).

SOBRALIA TRIANDRA Heller & Hawkes, sp. nov.

Planta epiphytica, rigida, erecta. Foliis elliptico-lanceolatis, patentibus. Floribus plerumque 2, patentibus, triandris. Label-

lum 7-nervosis, callis obsoletis.

Plant epiphytic, up to 1 m tall. Stems stiff, erect, yellow-green, slightly compressed, to 5 mm in diameter, the upper part with about 7 leaves, lower part concealed by dry leaf-sheaths, these like the stem with minute brown maculations. Leaves elliptic-lanceolate, yellow-green, spreading, to 13 cm long and 5 cm broad, borne 4 - 5 cm apart, fairly stiff, subcoriaceous, the upper surface smooth, set with 9 nerves that are sulcate on the underside, abruptly and shortly acuminate with an apicule at the tip (not tridentate). Pedicellate ovary clavate, to 3 cm long. Flowers usually 2, borne successively, widely expanding, to more than 10.5 cm across, the sepals and petals white often tinged with lavender; apical part of lip blue-lavender to violet-blue, the raised nerves in the tubular throat rich yellow. Sepals linear-lanceolate, acute, the dorsal one 6.5 cm long and 1/2 cm broad, the laterals oblique, 6.2 cm long and 1.5 cm broad above the middle. Petals oblanceolate, acute, with serrated margins in upper half, 5.8 cm long and 1.8 cm broad above the middle. Lip tightly tubular, with flaring apex, 3-lobed, obovate when spread out, convolute at base, 6 cm long and 4 cm broad, the apical lobe deeply retuse and with a blunt rounded apicule in the sinus, the apical margins crenulate and erose to deeply lacerate; disc with a flat sulcate smooth callus commencing at 1 cm from the base, this giving rise to 7 slightly elevated nerves which become more elevated and pronounced to beyond the middle of the lip, where they become sinuate, crenulate, and verrucose; there are often 1 or 2 lateral, obscurely elevated nerves as accessories; basal lateral calli and fovea obsolete. Column 3 cm long, clavate, slightly alate from top to bottom, the apex with a broad forward-projecting posterior tooth; clinandrium bears a shallow, serrated lobe on each side; anthers invariably 3; sometimes the lateral anthers have four divisions and on other occasions, two.

NICARAGUA: Dept. Jinotega: Macizo de Peñas Blancas, epiphytic, alt. 2500 feet, April 1961, A. H. Heller 7260 (Type in Field Museum of Natural History). Finca Santa Fé, alt. 3200 feet, June 1960, A. H. Heller 4571. Dept. Chontales: Cerro Pistacho, alt. 2150 feet, February 1961, A. H. Heller 6879. Dept. Matagalpa: Finca La Isla, alt. 3800 feet, March, A. H. Heller 8964.

In the seven raised nerves on the lip-disc, this species is a bit reminiscent of Sobralia Bouchei A. & S., of Panama. But it differs from that taxon in being consistently triandrous (apparently an unique condition in the genus), in that the raised nerves do not extend to the basal part of the lip, and in the naked disc there. Further, the flowers are of a different color, with the apical portion of the lip blue-lavender to violet-blue, a distinct-

ive hue for a *Sobralia*.

When the first collections of this extraordinary plant were made, the senior author of course thought that the three anthers were merely an aberration. But *Sobralia triandra* has now been found in widely separated localities in Nicaragua, and the trio of fertile anthers is invariably present.

The senior author also believes that the triandrous condition might have been developed for the perpetuation of the species, since seed-capsules are rarely encountered. Furthermore, the narrowness of the slender, tubular lip might not admit the larger usual pollinators for similar appearing large flowered *Sobralias*.

VANILLA Sw.

As of this writing, five species of the genus *Vanilla* Sw. have been found in Nicaragua. *Vanilla planifolia* Andr. and *V. Pompona* Schiede have previously been recorded from the area, as noted by L. O. Williams in his *Enumeration* published in 1956 (*Ceiba*, Volume 5).

Critical exploration by A. H. Heller has brought to light *Vanilla Pfaviana* Rchb.f., previously known from Mexico, British Honduras, Guatemala, and Costa Rica; *V. odorata* Presl, previously known only from Ecuador and Bolivia; and an unusual plant, new to science, which is here described in his honor.

VANILLA HELLERI A.D.Hawkes, sp.nov.

Planta scandens, elongata, caulis flexuosis, subquadratis. Foliis carnosus, oblongo-ellipticis, ad apicem abrupte acuminate contractis. Floribus pro genere parvis, sub-patentibus. Labellum fortiter 3-lobis, lobo medio appendicis elongatis retrorsis complanatis ornato. Columna gracilis, sub-clavellata, infra stigmato pilis gracilis glandulosis ornatis.

Plant scandent, elongate, the rooting stems flexuose, subquadrate, sulcate on two sides, 1 cm in diameter, dark olive-green. Leaves 1 - 14 cm apart, fleshy, 12 - 14 cm long, 3.5 - 4.5 cm broad, oblong-elliptic, abruptly contracted to an acuminate apex 1 cm long, below abruptly contracted to a sulcate petiole 1 cm long. Inflorescence 10 cm long, with an almost obsolete peduncle, subumbellate, bearing a succession of up to 20 flowers. Flowers small for the genus, about 6 cm in diameter, semi-spreading, short-lived, the sepals whitish with underside of upper half greenish, the petals whitish, the lip bright yellow with orange appendages on the midlobe, the column white. Floral bracts triangular-ovate, dark green, 7 mm long and 4 mm broad. Pedicellate ovary slender, 5 cm long and 3 mm in diameter, white with the tip

of the ovary green. Sepals 4 cm long, slightly concave, with 7 - 9 nerves, the dorsal oblanceolate, 1.4 cm broad above the middle, the laterals 1.4 cm broad at middle, oblong-elliptic, oblique, sub-obtuse. Petals 4 cm long and 1.3 cm broad, oblong-elliptic, obtuse, set with thick 3-nerved median carinae on both surfaces. Lip strongly 3-lobed, 4 cm long and 3 cm across the lateral lobes when spread out, adnate to base of column and without a claw; midlobe densely covered with retrorse complanate elongated appendages; lateral lobes multi-nerved, with entire margins; a penicillate crest is located in the exact center of the lip, and from this point to the base there is a slightly raised verruciform callus which becomes rather dense and more tuberculate at the base. Column slender, rather straight, sub-clavellate, with fine glandular hairs extending for a short distance just below the stigmatic orifice.

NICARAGUA: Dept. Chontales: 2 miles south of La Libertad on the road to Santo Tomás, growing as a vine on a wild avocado (Persea sp.) tree, alt. 1900 feet, April 1962, A. H. Heller 7946 (Type in Oakes Ames Orchid Herbarium of Harvard University).

This interesting, small-flowered *Vanilla* has no close Central American allies. The structure of the lip in particular is most distinctive.

All plates by A. H. Heller

Plate 1. Epidendrum Hawkesii A. H. Heller, sp. nov.

Left, habit of flowering plant and inflorescence, with semi-mature seed-capsule. Upper right, flower, approx. natural size. Center, seed, considerably enlarged. Center below, sepals and petal. Lower center, column and lip in cross-section. Bottom, largest leaf. Center right, lip enlarged. Lower right, anther, two views, enlarged.

Plate 2. Helleriella nicaraguensis A. D. Hawkes, gen. et sp. nov.

Left, second year growth of flowering plant. Bottom left, anther and pollinia. Center, flower, dissected. Bottom, first year growth of plant. Top right, column and foot, in cross-section. Top center, oblique face-view of column. Center right, column and lip in lateral view.

Plate 3. Lepanthes Helleri A. D. Hawkes, sp. nov.

Upper left, habit of flowering plant. Lower left, leaf expanded, with stem-apex. Center left top, flower, enlarged considerably. Center left bottom, petal and lip, lateral view. Center top, petal, enlarged. Right top, lip expanded and lip with column. Center right, pollinia and anther. Bottom right center, lateral view of lip, enlarged. Bottom right, stem with dilated costate sheath.

Plate 4. Pleurothallis Alèxii A. H. Heller, sp. nov.

Top left, flowering plant. Top center, lateral and top view of flower. Top right, dorsal and lateral sepals. Center left, base of plant, showing attachment of inflorescence. Center, column and lip. Center right, anther-cap. Bottom left, column, front face. Bottom center left, lip, top view. Bottom center right, petal, frontal view. Bottom right, petal in cross-section.

Plate 5. Pleurothallis carnosilabia Heller & Hawkes, sp. nov.

Top left, flowering plant. Bottom left, anther. Top center left, floral bract. Below this, petal. Below this, flower. Below this, lip in natural position. Center top, flower, showing sepals and lip. Center right, column in lateral cross-section. Center bottom, two sections through lip. Top right, column and lip in natural position. Petal sectioned. Column seen in lateral section and in frontal view. Section of lip, column, and lateral sepals. Underside of lip-base, showing its carinae. Center right, section through petal. Bottom right, basal lobes of lip expanded.

Plate 6. Pleurothallis chontalensis Heller & Hawkes, sp.nov. Top left, flowering plant. Center left, column in face view. Center right, lip. Right, section through dorsal sepal, plus dissection of flower, except lip. Left center, pedicellate ovary, column, and lip, in lateral view. Right center, section through lateral synsepal and this segment. Bottom left, section through pedicellate ovary. Bottom left center, pollinia and anther. Bottom right center, apex of leaf.

Plate 7. Pleurothallis exesilabia Heller & Hawkes, sp.nov. Top left, flowering plant. Top center, longitudinal section of a leaf. Right, flower, dissected. Center left, lateral view of column and lip, and lateral cross-section of lip, showing cavity. Bottom left, column with basal callus, next basal auricle, next front of column, and to right, underside of lip. Bottom center, anther-cap and pollinia.

Plate 8. Pleurothallis Helleri A.D.Hawkes, sp.nov. Left, flowering plant. Top right, flower, dissected. Lower center right, lip expanded, plus lateral view of lip and same in cross-section. Bottom right, lateral view of column, frontal view of the column, and anther-cap with pollinia below.

Plate 9. Sobralia chatoensis Heller & Hawkes, sp.nov. Left, leaf, with portion of leaf-sheath. Flower, dissected. Bottom center, section across lip-disc. Center right, lateral and frontal views of column.

Plate 10. Sobralia Hawkesii A.H.Heller, sp.nov. Dissected flower on outline of average leaf. Bottom left, lip in natural lateral position. Center right, column with apex of pedicellate ovary in lateral position, and column in frontal view. Bottom right, cross-section through column.

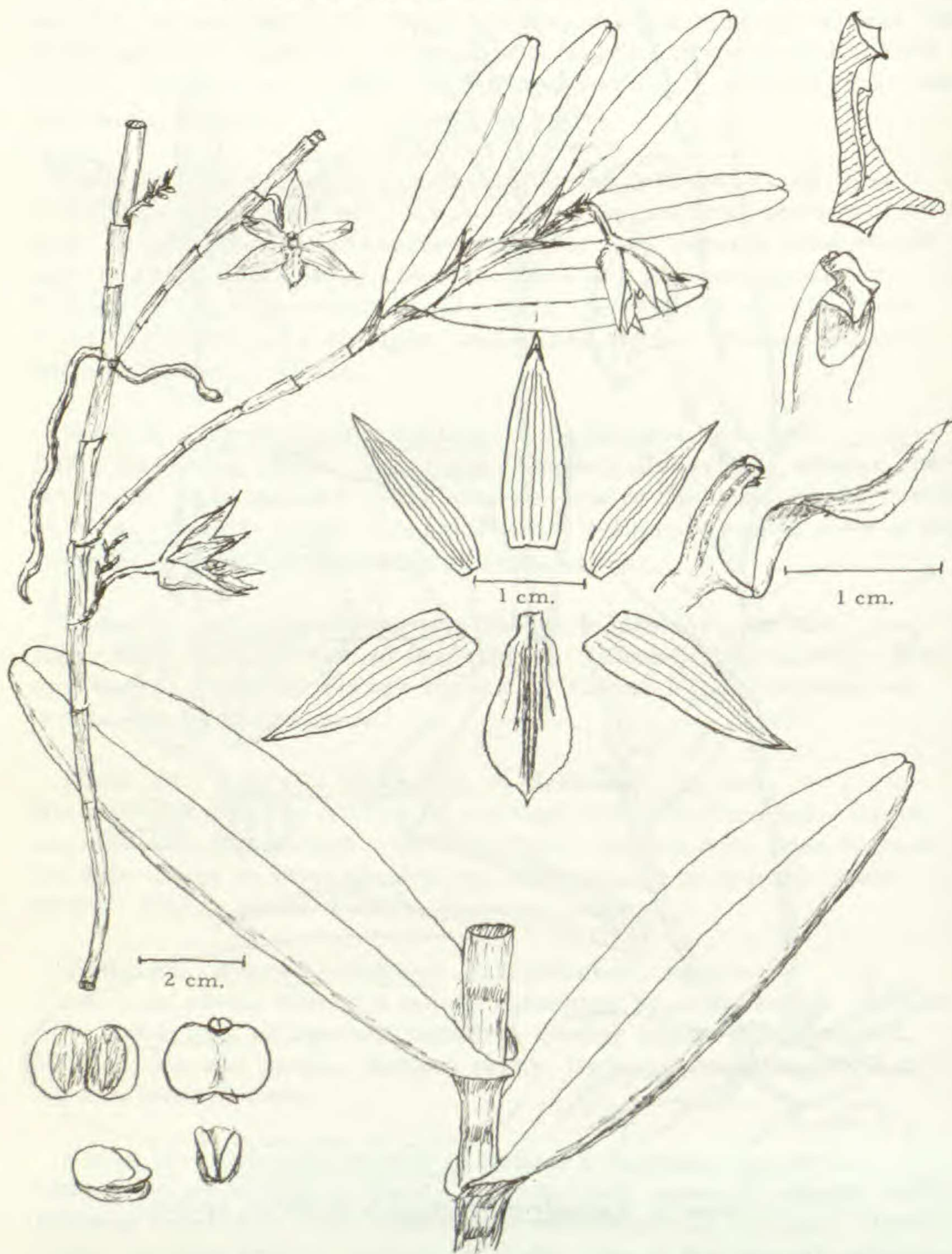
Plate 11. Sobralia Helleri A.D.Hawkes, sp.nov. Flowering plant, showing apical sheathing bract-system. Bottom left, underside of lip, and anther. Center right, lip expanded, plus sepals and petal. Bottom right, lip in lateral view, and column in lateral view.

Plate 12. Sobralia triandra Heller & Hawkes, sp.nov. Left, apex of flowering plant. Bottom left, apex of column with anthers removed. Top right, apex of triandrous column. Upper right, median anther, and to its right, one of the lateral anthers.

Plate 13. Vanilla Helleri A.D.Hawkes, sp.nov. Left, portion of leafy stem with flowering inflorescence. Center left, lateral view of column. Top center, frontal view of column. Dissection of floral parts.



Plate 1. Epidendrum Hawkesii A. H. Heller, sp. nov.

Plate 2. *Helleriella nicaraguensis* A.D.Hawkes, gen. et sp. nov.

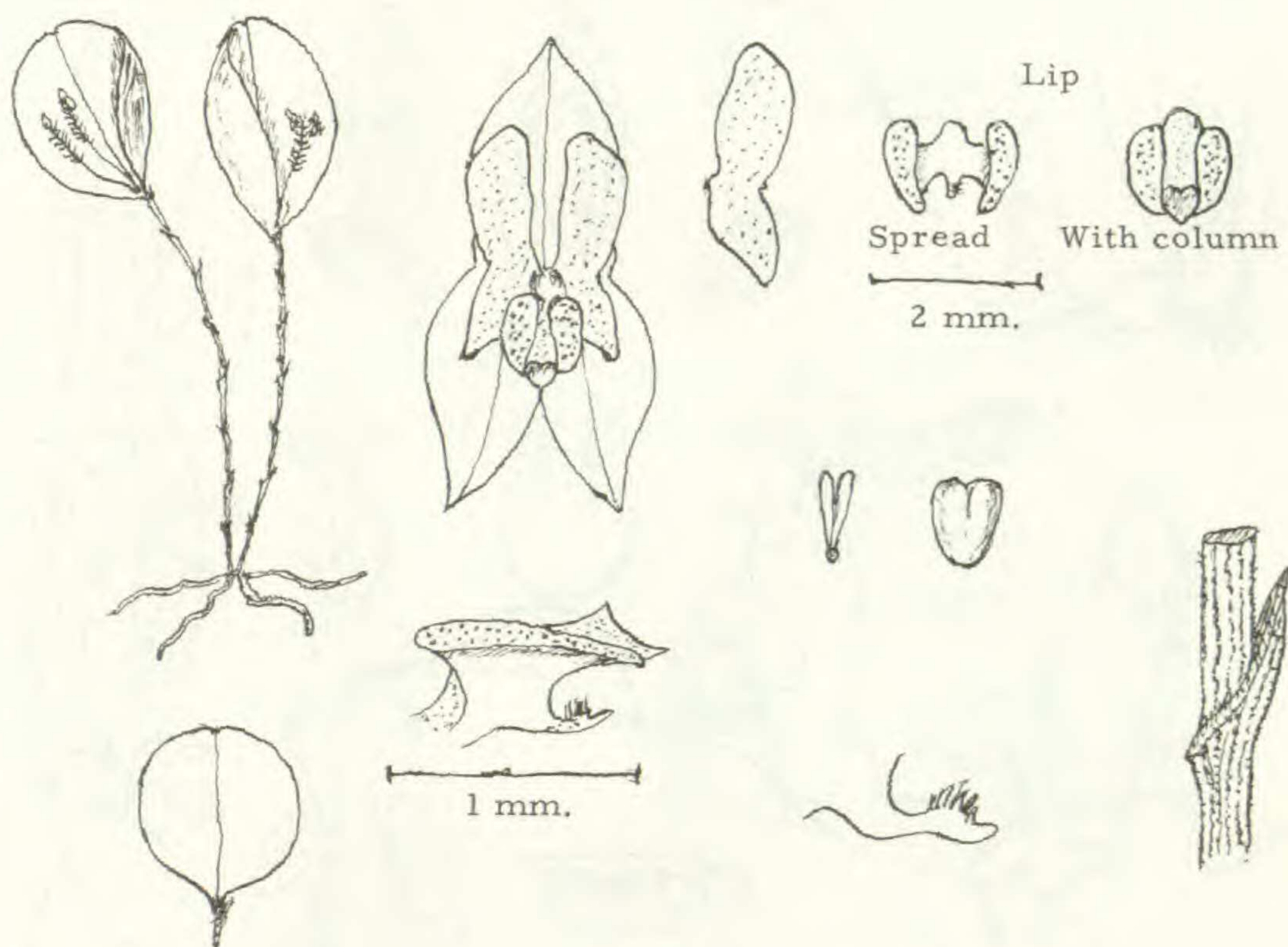


Plate 3. Lepanthes Helleri A. D. Hawkes, sp. nov.

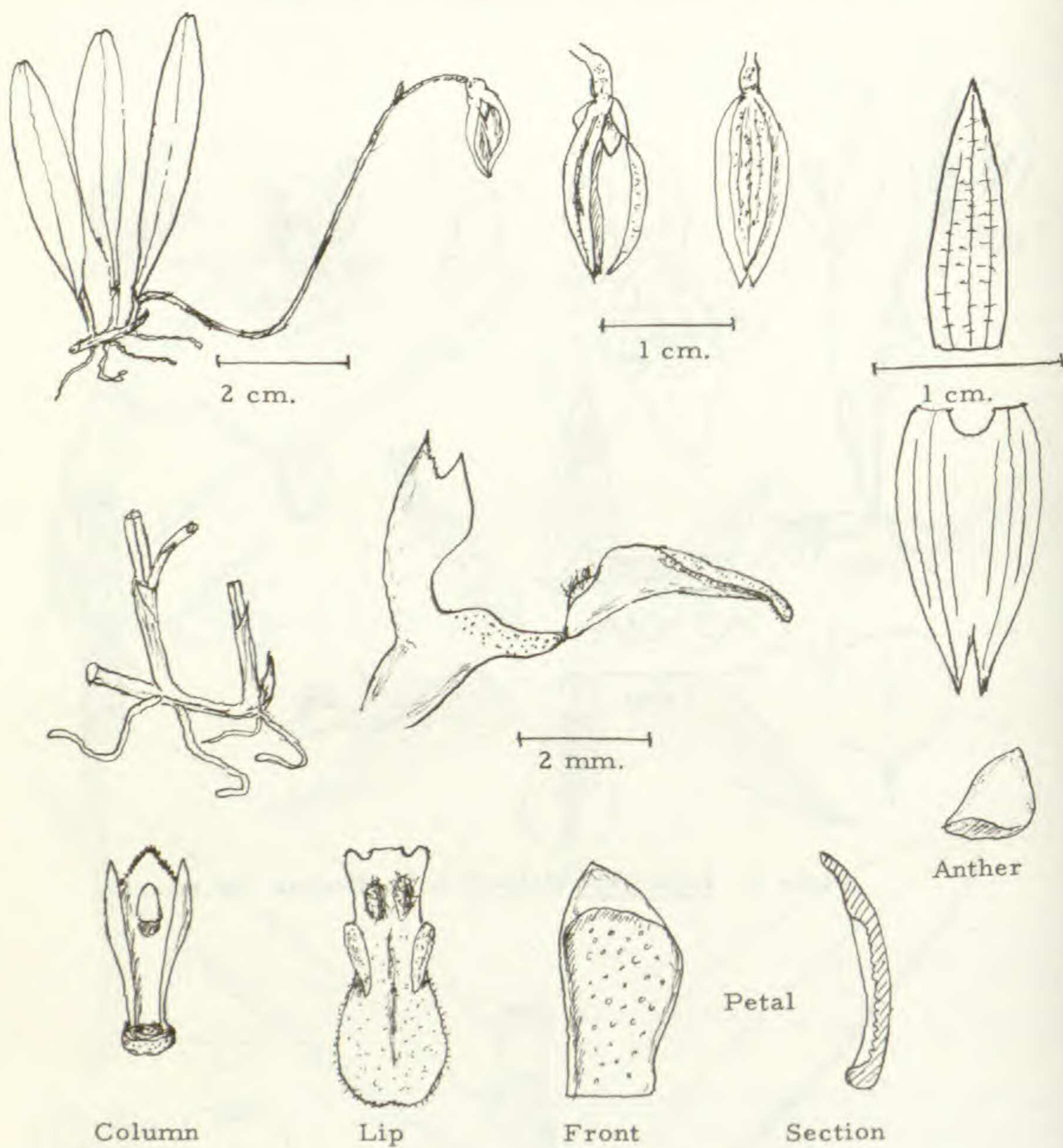


Plate 4. Pleurothallis Alexii A. H. Heller, sp. nov.

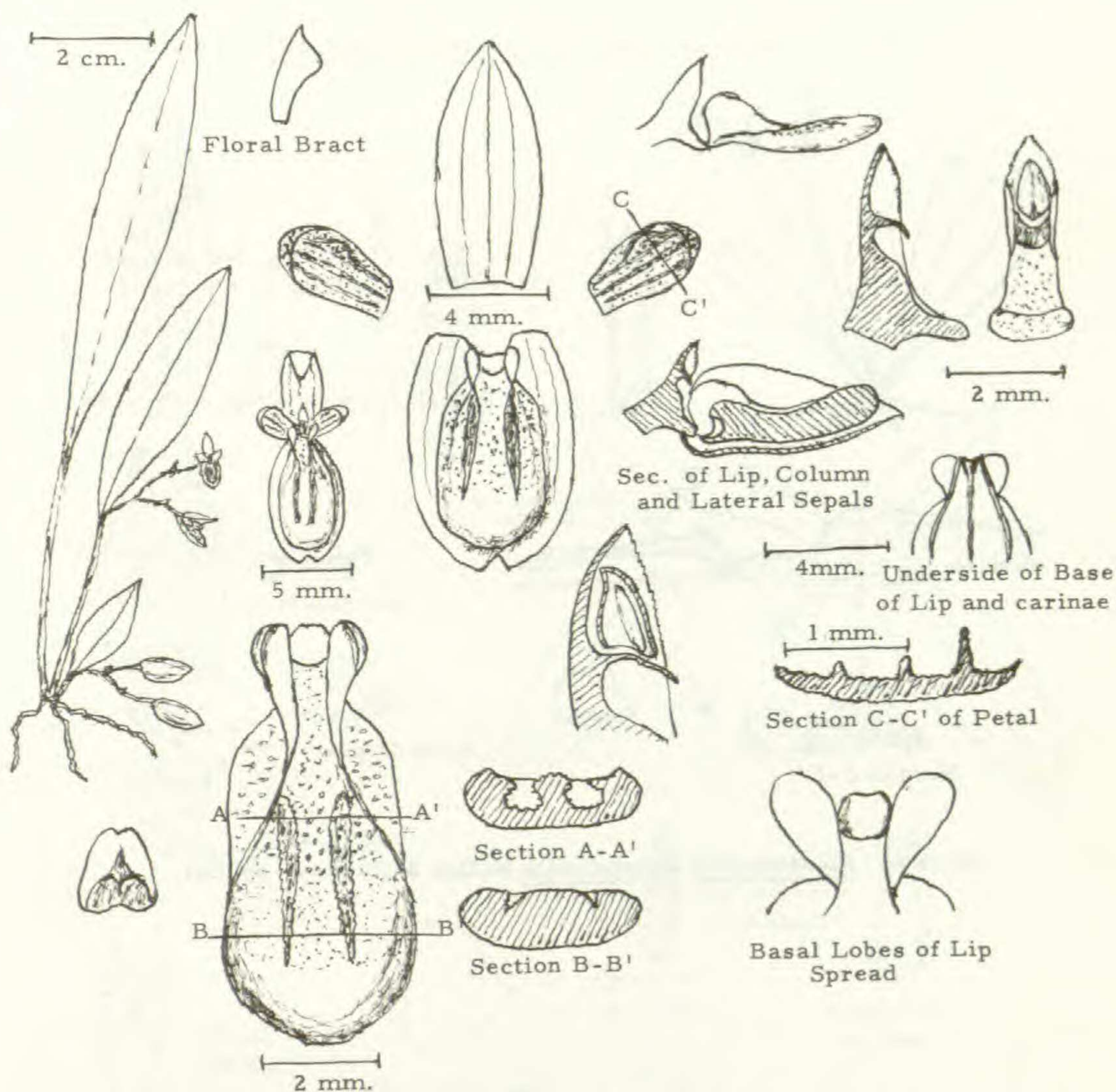


Plate 5. *Pleurothallis carnosilabia* Heller & Hawkes, sp. nov.

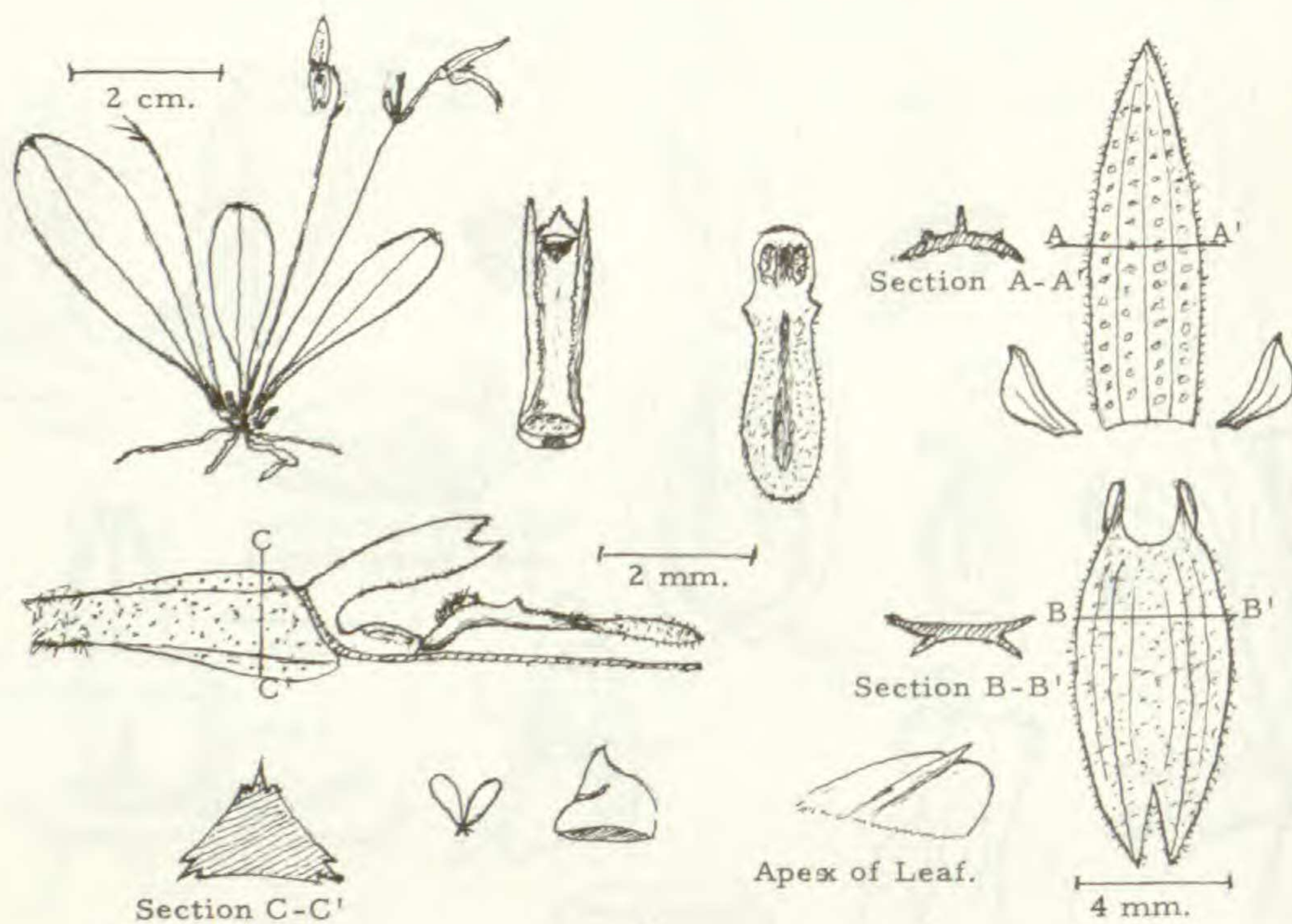


Plate 6. Pleurothallis chontalensis Heller & Hawkes, sp. nov.

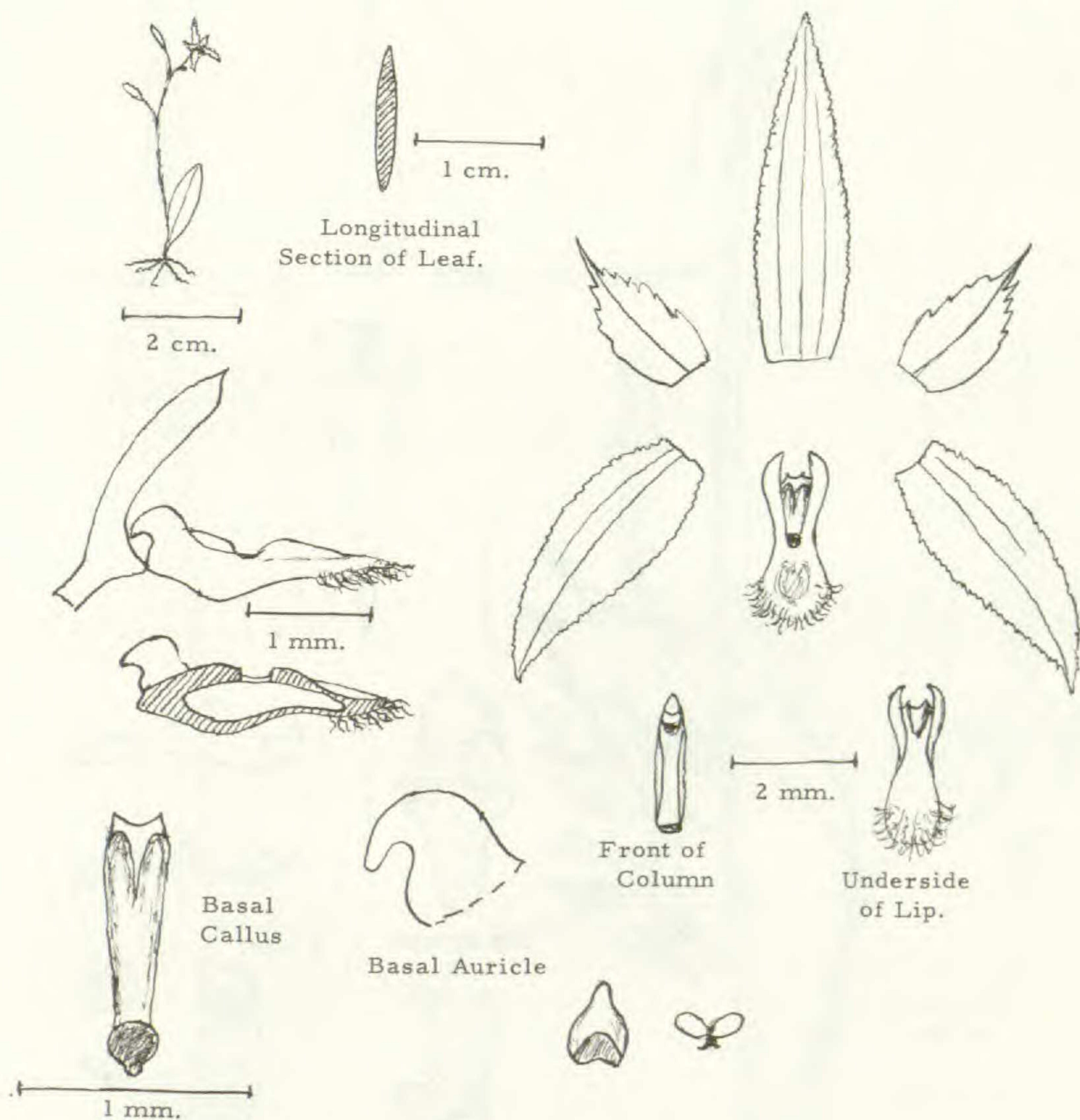
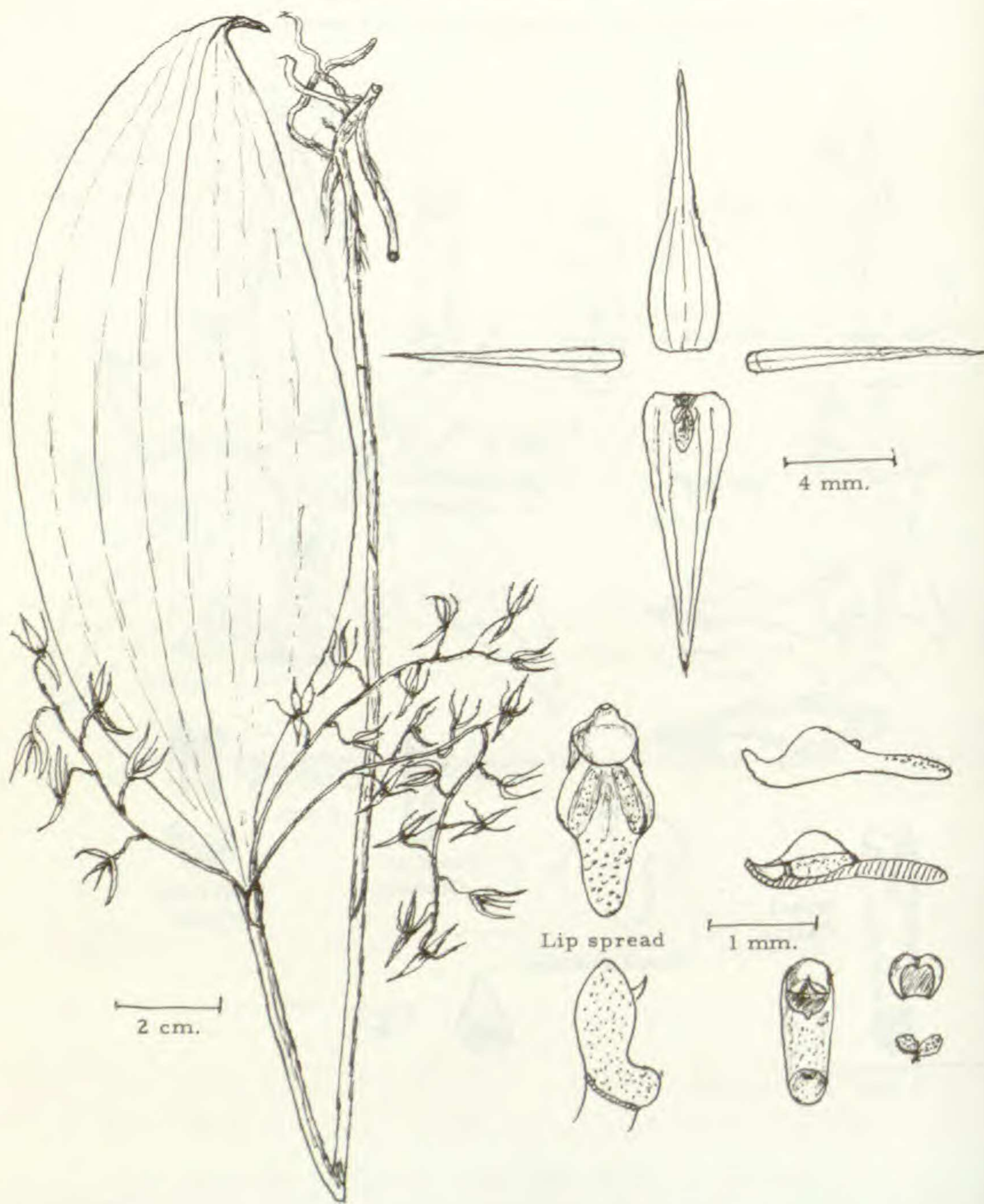
Plate 7. Pleurothallis exesilabia Heller & Hawkes, sp. nov.

Plate 8. Pleurothallis Helleri A. D. Hawkes, sp. nov.

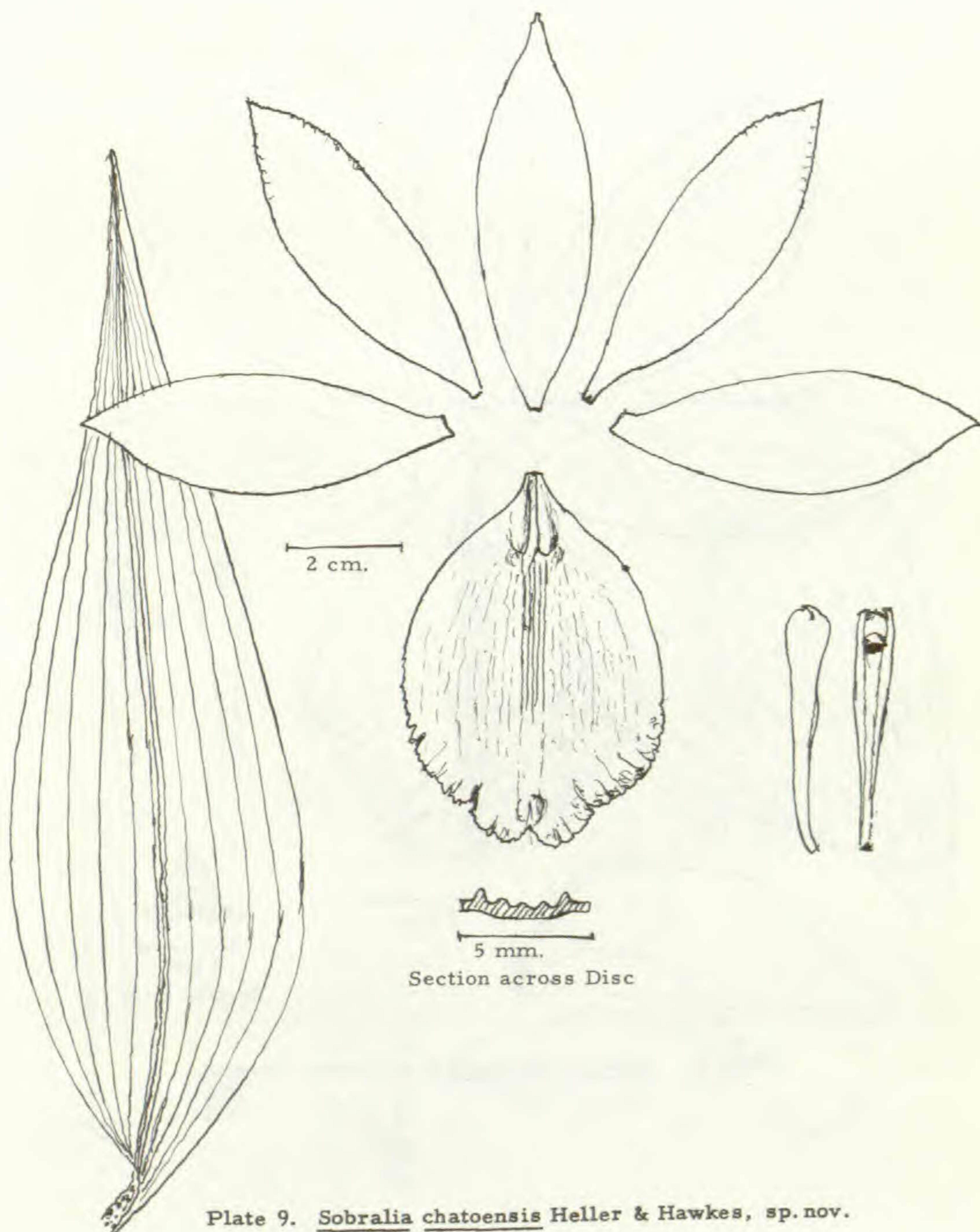


Plate 9. *Sobralia chatoensis* Heller & Hawkes, sp. nov.

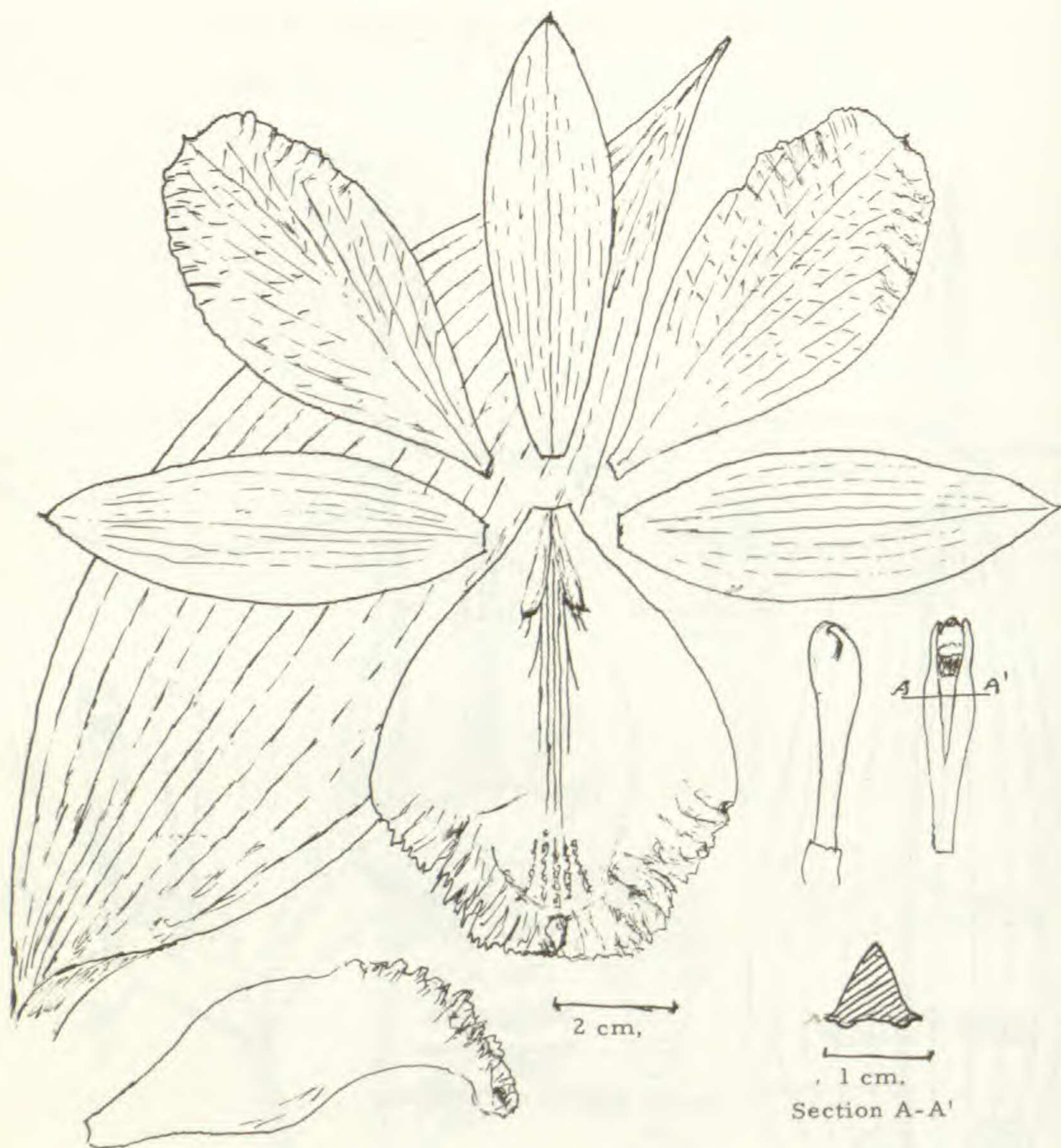


Plate 10. Sobralia Hawkesii A.H. Heller, sp. nov.

Plate 11. Sobralia Helleri A. D. Hawkes, sp. nov.

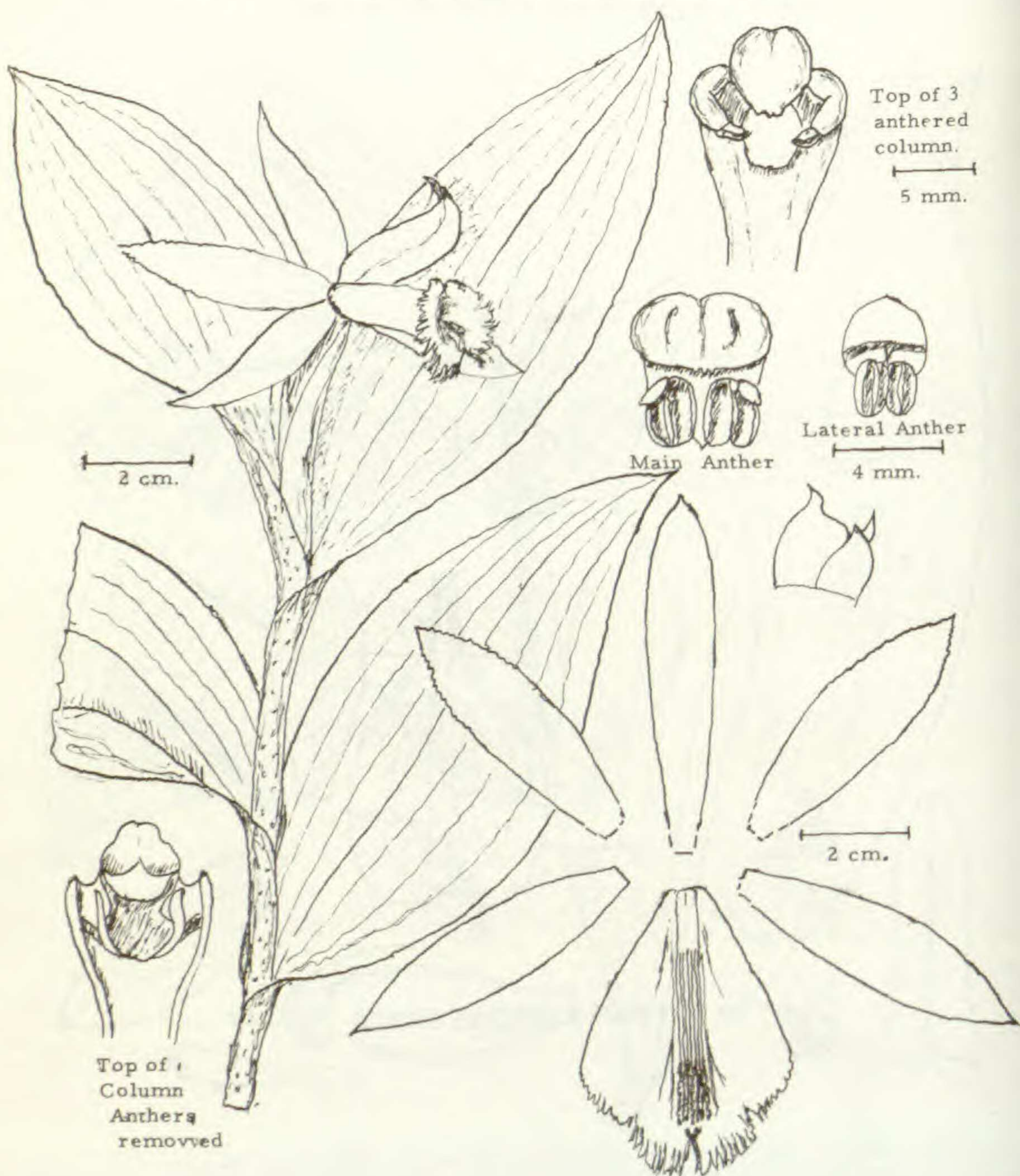
Plate 12. *Sobralia triandra* Heller & Hawkes, sp. nov.

Plate 13. Vanilla Helleri A. D. Hawkes, sp. nov.